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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

MOWLA, GOLAM

ART UNIT

PAPER NUMBER

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Advisory Action Before the Filing of an Appeal Brief	Application No. 10/506,895	Applicant(s) YAMASAKI ET AL.	
	Examiner GOLAM MOWLA	Art Unit 1795	

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

THE REPLY FILED 20 January 2010 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

1. ☒ The reply was filed after a final rejection, but prior to or on the same day as filing a Notice of Appeal. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114. The reply must be filed within one of the following time periods:

- a) ☒ The period for reply expires 3 months from the mailing date of the final rejection.
- b) ☐ The period for reply expires on: (1) the mailing date of this Advisory Action, or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.

Examiner Note: If box 1 is checked, check either box (a) or (b). ONLY CHECK BOX (b) WHEN THE FIRST REPLY WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

NOTICE OF APPEAL

2. ☐ The Notice of Appeal was filed on _____. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37 CFR 41.37(a).

AMENDMENTS

3. ☒ The proposed amendment(s) filed after a final rejection, but prior to the date of filing a brief, will not be entered because
- (a) ☒ They raise new issues that would require further consideration and/or search (see NOTE below);
- (b) ☐ They raise the issue of new matter (see NOTE below);
- (c) ☐ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or
- (d) ☐ They present additional claims without canceling a corresponding number of finally rejected claims.

NOTE: See Continuation Sheet. (See 37 CFR 1.116 and 41.33(a)).

4. ☐ The amendments are not in compliance with 37 CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).
5. ☐ Applicant's reply has overcome the following rejection(s): _____.
6. ☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).
7. ☒ For purposes of appeal, the proposed amendment(s): a) ☒ will not be entered, or b) ☐ will be entered and an explanation of how the new or amended claims would be rejected is provided below or appended.
- The status of the claim(s) is (or will be) as follows:
- Claim(s) allowed: _____.
- Claim(s) objected to: _____.
- Claim(s) rejected: 1-6,8,10 and 11.
- Claim(s) withdrawn from consideration: _____.

AFFIDAVIT OR OTHER EVIDENCE

8. ☐ The affidavit or other evidence filed after a final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).
9. ☐ The affidavit or other evidence filed after the date of filing a Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing a good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).
10. ☐ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

REQUEST FOR RECONSIDERATION/OTHER

11. ☒ The request for reconsideration has been considered but does NOT place the application in condition for allowance because:
See Continuation Sheet.
12. ☐ Note the attached Information *Disclosure Statement*(s). (PTO/SB/08) Paper No(s). _____
13. ☐ Other: _____.

/Alexa D. Neckel/
 Supervisory Patent Examiner, Art Unit 1795

/G. M./
 Examiner, Art Unit 1795

Continuation of 3. NOTE: The added limitation in claim 6 alters the scope of the claim, which requires further search and consideration .

Continuation of 11. does NOT place the application in condition for allowance because:

1. Rejection of claims 1-3 under 35 U.S.C. 102(b) as being anticipated by Nakai et al. (US 6,207,890 B1).

On pages 6-7 of Remarks, Applicant argues Nakai does not disclose a partial contact, rather shows a full contact between the front electrode (4) and p-type amorphous silicon layer (3). This argument is persuasive. However, claims 1-3 still stand rejected under 35 U.S.C. 103(a) (see below), and therefore, the finality of the Office Action is maintained.

2. Rejection of claims 1-3 and 10 under 35 U.S.C. 103(a) as being unpatentable over Nakai et al. (US 6,207,890 B1) in view of Tsuzuki et al. (US 6,184,457 B1).

On page 7 of Remarks Applicant argues that layer 3 in Nakai is not in partially contact with the collecting electrode 5. Instead, there is complete separation between layer 3 and electrode 5, provided by the intervening layer 4.

The Examiner respectfully disagrees. Firstly, Nakai explicitly shows that the p-type amorphous silicon layer (3) being in partially contact with the comb-like collecting electrode (5) (see fig. 11). What Nakai fails to disclose is a direct contact between the p-type amorphous silicon layer (3) and the comb-like collecting electrode (5), which is cured using the secondary reference, Tsuzuki et al. (US 6,184,457 B1).

In paragraph bridging pages 7 and 8, Applicant also argues that the Examiner has not said what to do with layer 4 that exists in Nakai and acts as a front electrode, if the structure of Tsuzuki were to be adopted, i.e., a structure that does not include an intervening layer between the semiconductor layer and the comb-like electrode.

The Examiner notes that Tsuzuki also teaches an intervening layer (805) and the front electrode (804) is formed within the recess of the intervening layer (805) to be partially in direct physical contact with the p-type semiconductor layer (802). Hence one skilled in the art would know how to make a direct physical contact between layers 3 and 5 of Nakai.

On page 8 of Remarks, Applicant also argues that there is no point in replacing the collecting electrode 5 with a collector electrode 804 of Tsuzuki, because, in Nakai, a collecting electrode 5 (corresponding to "front electrode 8" of the invention of claim 1) does not physically contact with a p-type amorphous silicon layer 3 (corresponding to "second conductivity type semiconductor layer 5 of the invention of claim 1) due to the front electrode 4 (which is deemed to be an essential element of Nakai) interposed therebetween (see Fig. 11).

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

On page 8 of Remarks, Applicant also argues that a semiconductor layer of Tsuzuki comprises two layers, i.e., a semiconductor layer 802 (i.e., p- or n-type layer) and a semiconductor layer 801 (i.e., n- or p- type layer), laminated in this order from a side that receives light. These two layers thus constitute a p-n junction structure.

Examiner notes that Tsuzuki reference was used the partial direct physical contact between the comb-like electrode and p-type semiconductor, not the PN structure of Tsuzuki.

On page 9 of Remarks, Applicant also argues that the solar cell of Nakai and the solar cell of Tsuzuki are very different from each other in structure, and accordingly, it is improper to combine the invention of Nakai, in which the p-type layer 3 has the front electrode 4 adjacent thereto by necessity, and the invention of Tsuzuki, in which the semiconductor layer 802 does not need such a layer.

The Examiner respectfully disagrees. First of all, the front electrode of 4 of Nakai is not being replaced or eliminated, and therefore the function of the layer 4 is maintained. In addition, Tsuzuki teaches an intervening layer (805) and the comb-like electrode (804) is formed within the recess of the intervening layer (805) to be partially in direct physical contact with the p-type semiconductor layer (802). Hence, one skilled in the art would know how to make a direct physical contact between layers 3 and 5 of Nakai without eliminating layer 4.

3. Claims 1-3 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakai et al. (US 6,207,890 B1) in view of Nino et al. (US 5,514,217 A), and further in view of Tsuzuki et al. (US 6,184,457 B1).

On page 9 of Remarks, Applicant presents the same argument that the combination of Nakai/Tsuzuki fails to teach the claimed "the second conductivity type semiconductor layer being partially in direct physical contact with the front electrode". The Examiner respectfully disagrees for the reason stated above.

4. Rejection of Claims 1-3 under 35 U.S.C. 103(a) as being unpatentable over Nakai et al. (US 6,207,890 B1) in view of Nino et al. (US 5,514,217 A).

On pages 9-10 of Remarks, Applicant argues Nakai does not disclose a partial contact, rather shows a full contact between the front electrode (4) and p-type amorphous silicon layer (3). This argument is persuasive. However, claims 1-3 still stand rejected under 35 U.S.C. 103(a) (see above and below), and therefore, the finality of the Office Action is maintained.

5. Rejection of Claims 1, 4, 5, 8 and 10-11 under 35 U.S.C. 103(a) as being unpatentable over Schmidt (US 4,577,393) in view of Okamoto et al. (JP 04-356972A) and further in view of collective teachings of Matsuyama et al. (US 6,072,117) and Nakayama (US 5,620,530).

On page 12 of Remarks, Applicant argues that the solar cell of Matsuyama and the solar cell of Okamoto are very different from each other in structure, and accordingly, it is improper to combine the invention of Matsuyama, in which the p-type layer 106 has the transparent electrode 107 adjacent thereto by necessity, and the invention of Okamoto, in which the N-type semiconductor layer 1 does not need such a layer. On page 13 of Remarks, Applicant also argues that the solar cell of Nakayama and the solar cell of Okamoto are very different from each other in structure, and accordingly, it is improper to combine the invention of Nakayama, in which the p-type layer 109 has the transparent electrode 110 adjacent thereto by necessity, and the invention of Okamoto, in which the N-type semiconductor layer 1 does not need such a layer.

The Examiner respectfully disagrees. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). In addition, Matsuyama discloses a photoelectric conversion device wherein the semiconductor substrate (104) has convex and concave portions and the successive semiconductor layers (105 and 106) also has convex and concave portions along the convex and concave portions of the semiconductor substrate (104) (see fig. 1, 7:18-47, 20:56-61) in order to allow for a device which possesses increased photoelectric conversion efficiency. Nakayama also discloses that the use of convex and concave portions in the semiconductor layers enhance the effect of light trapping (20:66-21:12), and therefore increase the photoelectric conversion efficiency. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized the teachings of Matsuyama and Nakayama in the photoelectric conversion device of Schmidt in view of Okamoto to form concave and convex portions on the surface of the second conductivity type layer along convex and concave portions of the p-type semiconductor body such that the effect of light trapping is enhanced, and thereby increase in the photoelectric conversion efficiency is achieved, as taught by collective teachings of Matsuyama and Nakayama.

6. Rejection of Claim 6 under 35 U.S.C. 103(a) as being unpatentable over Schmidt (US 4,577,393) in view of Uematsu et al. (US 4,916,503) and Okamoto et al. (JP 04-356972A), and further in view of collective teachings of Matsuyama et al. (US 6,072,117) and Nakayama (US 5,620,530).

New limitations that would require further consideration and search are presented in claim 6, such as "itching and removing the film serving as impurity diffusion". Applicant's arguments are directed to the claims as presented in the after-final amendment, which will not be entered for the reasons given above. They are therefore not persuasive.